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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/673,247 | 09/30/2003 | Koji Yamakawa | 243433US2SX | 2835 |
| 22850 | 7590 | 05/14/2007 | | |
| OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | | |
| | | | EXAMINER | |
| | | | TRAN, BINH X | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1765 | |
| | | | NOTIFICATION DATE | DELIVERY MODE |
| | | | 05/14/2007 | ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/673,247 | Applicant(s) YAMAKAWA ET AL. | |
| | Examiner Binh X. Tran | Art Unit 1765 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5 and 6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5 and 6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>03/15/07; 11/22/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-2, 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. (US 2001/0007364 A1) in view of Engelhardt et al. (US 6,730,562).

Respect to claim 1, Kondo discloses a method for making a capacitor in which a dielectric (38 or 74) is used, wherein a conductive complex oxide (40, or 40b) having an exposed top surface is used as a mask when the dielectric film is subjected to an dry etching process and the mask material (40, 40b), which is in direct contact with the dielectric film (38 or 74), is used as an upper electrode (46a, 76a) of the capacitor after

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the etching process is performed and the area of a top surface of the dielectric film (38 or 74) equal to an area of a bottom surface of the mask material (40 after the etching step is performed (Fig 7A, Fig 11A; paragraph 0070-0071, 0061, 0124-0125).

Kondo fails to disclose the etching process is the reactive ion etching. However, Kondo clearly teaches to use dry etching process using Cl_2 , O_2 and argon gas (paragraph 0061). In a semiconductor process, Engelhardt teaches to use dry etching process including reactive ion etching to etch the upper electrode and the ferroelectric film using Cl_2 , O_2 and Argon (col. 7 lines 35-60). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kondo in view of Engelhardt by using reactive ion etching because equivalent and substitution of one for the other would produce an expected result.

Respect to claim 2, Kondo discloses the complex oxide contains SrRuO_3 (aka SRO, See Kondo paragraph 0071, Fig 7A). Engelhardt also discloses the complex oxide contains SrRuO_3 (See col. 1 lines 48-50, col. 3 lines 45-50)

Respect to claim 5, Kondo discloses the dielectric film (38 or 74) contains PZT as a main component (paragraph 0071, Fig 7A, Fig 11A). Respect to claim 6, Kondo discloses IrO_2 or Pt or laminated structure is used as a material for the lower electrode (36b or 72 or 72b) of the capacitor (Figures 7B, Fig 10B, Fig 11B, paragraph 0072, 0125).

Response to Arguments

4. Applicant's argument with respect to claims 1-2, 5-6 rejection base on Shinohara as a reference (See page 3-4 of the remark) is persuasive. Specifically, the applicants

argue that "in Shinohara, the area of the bottom surface of the upper electrode 13 is smaller than that of the top surface of the dielectric film 12 after etching, as is shown in Fig 2C of Shinohara". This argument is persuasive, thus, the examiner withdraws the previous ground of rejection based on Shinohara reference. However, upon further consideration, the examiner provides a new ground of rejection as discussed above. The new cited prior art (Kondo) clearly teaches to use a complex oxide having an exposed top surface as the mask. Kondo further discloses the area of the top surface of the dielectric film (BZT) being equals to an area of a bottom surface of the mask material (SRO) after the etching process (Fig 7A, 11A).

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X. Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Binh Tran

Binh X. Tran